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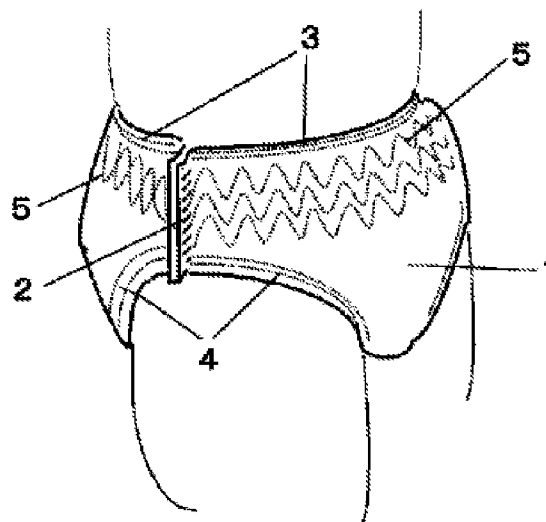
(54) [Title] Pants-type disposable diaper

(57) Abstract

Purpose: To provide a pants-type disposable diaper characterized by the fact that slip or falloff can hardly take place when it is put on, and it has excellent fit with good effect of preventing leakage from the waist and thigh portions.

Constitution: Elastic members are arranged on the waist portion of the outer sheet so that stretchability is realized in its lateral direction and vertical direction.

Figure 4



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## Claims

1. A pants-type disposable diaper characterized by the fact that for the pants-type disposable diaper consisting of a main body having an outer surface member, an absorbing member and a leak-proof sheet, and an outer sheet in a pants shape, a fit gather containing elastic members is arranged on the waist portion of said outer sheet to provide stretchability in the lateral and vertical directions.

2. The pants-type disposable diaper described in Claim 1, characterized by the fact that the elastic members arranged to have stretchability in the lateral and vertical directions are curved up/down and are arranged in the lateral direction in all or most of the waist portion of the outer sheet.

3. The pants-type disposable diaper described in Claim 1 or 2, characterized by the fact that the curved elastic members are arranged in the lateral direction while stretched to form a curved fit gather.

4. The pants-type disposable diaper described in any of Claims 1-3, characterized by the fact that plural curved elastic members are arranged while stretched.

5. The pants-type disposable diaper described in any of Claims 1-4, characterized by the fact that the curve pattern of the curved elastic members may be zigzag, a sine curve, sector shape, or other meandering shape or a combination of said shapes.

6. The pants-type disposable diaper described in any of Claims 1-5, characterized by the fact that the pitch of the curves of said curved elastic members in the lateral direction of the curves is in the range of 5-100 mm.

7. The pants-type disposable diaper described in any of Claims 1-6, characterized by the fact that the plural arranged curved elastic members have the same or different curve patterns.

8. The pants-type disposable diaper described in any of Claims 1-7, characterized by the fact that the plural arranged curved elastic members cross each other and/or have superposed portions.

9. The pants-type disposable diaper described in any of Claims 1-8, characterized by the fact that the elastic members of the fit gather arranged on the waist portion of the outer sheet have the same or different curve patterns for the belly side and back side of the waist portion.

10. The pants-type disposable diaper described in any of Claims 1-9, characterized by the following facts: the fit gather on the waist portion arranged in the lateral direction throughout the portions between the two side edges of the outer sheet is made of a fit gather curved up/down in its entirety, or made of a combination of fit gather portions curved up/down over the major portion and fit gather portions in linear shape over a smaller portion of the fit gather; the curved fit gather or the combination of fit gather portions curved up/down and fit gather portions in linear shape is made of a series of continuous elastic members.

11. Disposable pants characterized by the following facts: the disposable pants are used as a diaper prepared by double folding a main body consisting of an outer surface member, a leak-proof sheet, and an absorbing member in the front/rear direction, and having the two side edge portions jointed and secured; a fit gather is arranged on the waist portion, and the fit gather is curved up/down.

#### Detailed explanation of the invention

[0001]

Technical field of the invention

The present invention pertains to a pants-type disposable diaper having a curved fit gather on it.

[0002]

Prior art

The pants-type disposable diaper in the prior art consisting of a main body made of an outer surface member, an absorbing member and a leak-proof sheet, and an outer sheet in a pants shape, has an elastic member bonded in the lateral direction at the position of the waist portion of the outer sheet. However, although it can stretch under the force in the lateral direction and has fitting property, it nevertheless has poor stretchability in the vertical direction, so that it has little effect in preventing “slip or falloff” due to the absorbing member, which becomes heavy after absorption. Consequently, there is a demand for development of a scheme to solve said problems.

[0003]

Problems to be solved by the invention

The purpose of the present invention is to solve the aforementioned problems of the prior art by providing a scheme characterized by the fact that elastic members with stretchability not only in the lateral direction but also in the vertical direction are arranged, so that there is a force that pulls upward, and hence an improvement is made with respect to leakage and absorptivity.

[0004]

Means to solve the problems

The present invention provides a pants-type disposable diaper characterized by the fact that the pants-type disposable diaper, consisting of a main body having an outer surface member, an absorbing member and a leak-proof sheet, and an outer sheet in a pants shape, has a fit gather

containing elastic members arranged on the waist portion of said outer sheet to provide stretchability in the lateral and vertical directions.

[0005]

In the pants-type disposable diaper of the present invention, the elastic members arranged to provide stretchability in the lateral and vertical directions are curved up/down and are arranged in the lateral direction in all or most of the waist portion of the outer sheet. In addition, the curved elastic members are arranged in the lateral direction while stretched to form the curved fit gather. The plural curved elastic members are arranged while stretched.

[0006]

In the pants-type disposable diaper of the present invention, the curve pattern of the curved elastic members may be zigzag, sine curve, sector shape, or other meandering shape or a combination of said shapes. The pitch of the curves of said curved elastic members in the lateral direction of the curves is in the range of 5-100 mm.

[0007]

In the pants-type disposable diaper of the present invention, the plural arranged curved elastic members have the same or different curve patterns. Also, the plural arranged curved elastic members cross each other and/or have superposed portions. In addition, in the pants-type disposable diaper of the present invention, the elastic members of the fit gather arranged on the waist portion of the outer sheet have the same or different curve patterns for the belly side and back side of the waist portion. In addition, the fit gather on the waist portion arranged in the lateral direction throughout the portions between the two side edges of the outer sheet is made of a fit gather curved up/down in its entirety, or made of a combination of fit gather portions curved up/down over the major portion and fit gather portions in linear shape over a smaller portion of the fit gather; the curved fit gather or the combination of fit gather portions curved up/down and fit gather portions in linear shape is made of a series of continuous elastic members.

[0008]

#### Operation

As shown in Figures 1, 2, and 3, in an embodiment of the present invention, plural curved elastic members are arranged while stretched. Here, the curve patterns include the zigzag shape shown in Figure 1, the sine curve shown in Figure 2, the sector-shape shown in Figure 3, and their combinations. Here, the pitch may be selected appropriately in the range of 5-100 mm. If the pitch is over 100 mm, the ratio of the stretching force in the vertical direction to that in the

lateral direction is small, so that a sufficient fitting property cannot be realized. On the other hand, when the pitch is smaller than 5 mm, an effective pattern cannot be obtained. The amplitude in the vertical direction can be selected appropriately in the range of 2-100 mm, or preferably in the range of 2-50 mm. If the amplitude is over 100 mm, the ratio of the stretching force in the vertical direction to that in the lateral direction becomes large, and a preferable fitting property cannot be realized. On the other hand, if it is smaller than 2 mm, an effective pattern cannot be realized. With the pitch in the range of 5-100 mm, and with the up/down amplitude in the range of 2-50 mm, it is possible to obtain a pants-type disposable diaper for which slip or falloff can hardly take place, and the feel when wearing is excellent. The curved elastic members may cross each other or superpose each other. The patterns of the elastic members on the belly side and back side may be different from each other. Examples of the elastic members include polyurethane rubber, natural rubber, etc.

[0009]

#### Application examples

In the following, an explanation will be given regarding application examples of the present invention. However, the present invention is not limited to these as they are only presented as examples.

[0010]

#### Example 1

Figure 4 is a diagram illustrating the pants-type disposable diaper of the present invention when put on the user. Here, outer sheet (1) having a pants shape has a series of front/rear members (belly-side member and back-side member) having a groin portion at the middle, and it is double folded at the groin portion to front/rear portions. Two side edge portions (2) are arranged facing outward, and the portions of the outer sheet are superposed and bonded in an overlapped shape. At the waist opening portion and thigh opening portions, waist opening portion's elastic gather (3) and thigh opening portion's elastic gathers (4) are arranged. In the waist portion between said waist opening portion's elastic gather (3) and thigh opening portion's elastic gathers (4) of said outer sheet (1), elastic members (5), (5), which zigzag up/down in the waist portion between two side edge portions (2), (2), are arranged. On the waist portion of the front member, curved elastic members (5) are arranged in three strips separated from each other in the up/down direction and nearly parallel with each other. On the waist portion of the rear member, two strips of curved elastic members (5) in a sine shape and having the same period and the same amplitude are formed crossing each other with their phases deviated from each other by half a period (90°).

[0011]

#### Example 2

Figure 5 is a diagram illustrating another example of the configuration of said elastic members (5), (5). It shows the developed state of outer sheet (1). Here, thigh opening portion's elastic gathers (4) are formed as a pair for the front member and rear member. The members are connected to each other at the groin portion, and they are arranged symmetrically with prescribed interval (6) in the groin portion. (7) represents the main body installed by bonding or other appropriate jointing means inside outer sheet (1) (made of a 2-layer nonwoven fabric structure), and the main body consists of an outer surface member, an absorbing member and a leak-proof sheet. In this example, elastic members (5), (5) are formed as a combination of two strips of elastic members arranged as upper/lower strips parallel with each other in linear zigzag shape and two elastic members crossing and connecting to each other to form a string-of-pearl shape arranged between said two strips. Figure 10 is a cross-sectional view illustrating the groin portion shown in Figure 5. Here, (8) represents the leak-proof sheet, (9) represents the absorbing member, (10) represents the outer surface member (center), and (10') represents the outer surface member for three-dimensional gather (side).

[0012]

#### Example 3

Figure 6 is a diagram illustrating other elastic members different from that shown in Figure 5. Here, curved elastic members (5) are made of two strips of elastic members in linear shape having the same period and the same amplitude which are arranged with their crest portions and trough portions in agreement with each other for the upper/lower strips.

[0013]

#### Example 4

Figure 7 is a diagram illustrating another example of the configuration of the elastic members. In this example, curved elastic members (5) are made of a combination of continuous curved portion (5-A) and non-curved portion (linear portion) (5-B). For the waist portion corresponding to the left/right thigh opening portions, curved portion (5-A) is formed in the same crossing zigzag shape as in Figure 6. On the other hand, for the waist portion corresponding to intermediate main body (7), non-curved portion (5-B) is formed as parallel upper/lower trapezoidal strips.

[0014]

Example 5

Figure 8 is a diagram illustrating another example of the configuration of the elastic members (5). Here, the curve shapes of elastic members (5) on the belly side and back side are different from each other. While the belly side adopts the same crossing zigzag shape as Figure 6, the back side adopts the up/down two parallel strips of zigzag shaped elastic members (5).

[0015]

Example 6

Figures 11 and 12 illustrate an example of the pants shape for the main body structure alone. Here, main body (7) consisting of outer surface member (10) (10') and leak-proof sheet (8) prepared by laminating a nonwoven fabric on a polyethylene or other film, as well as absorbing member (9) arranged between said two sheets (10), (8) is double folded from the spread state shown in Figure 11 in the front/rear direction, and the two side edges (12), (12) are jointed and secured to form the diaper. Said curved elastic members (5) on the waist portion are arranged in zigzag shape to form a fit gather on the waist portion. It also works as the waist opening portion's elastic gather. Here, (11) represents the thigh elastic members. Said outer surface member (side) (10') has elastic members at the central end portion in the lateral direction, forming a three-dimensional gather.

[0016]

Conventional example

As shown in Figure 9, on the waist portion of outer sheet (1), plural strips of curved elastic members (5) are arranged in linear shape parallel with waist opening portion's elastic gather (3).

[0017]

Effect of the invention

The following is a brief summary of the effect of the present invention.

(1) Different from the waist portion's gather in the prior art having plural elastic members arranged in the lateral direction to realize stretchability, according to the present invention, a single elastic member can realize stretchability in the vertical direction and oblique directions. Consequently, there is little chance that the disposable diaper will slip and fall off during use, and the feel when wearing is excellent. Also, it is possible to prevent leakage from the waist and the thigh portions.



(2) Different from the prior art in which plural strips of elastic members are arranged, it is possible to reduce the number of the elastic members.

(3) It is possible to realize good fitting property corresponding to the body shapes of the users by adopting different patterns for the belly side and back side, and it is possible to put on the disposable diaper without distinguishing the front/rear sides. That is, it is possible to improve on the convenience for the users.

#### Brief description of the figures

Figure 1 is a schematic diagram illustrating the curved state of the elastic members for use in the present invention.

Figure 2 is a schematic diagram illustrating another example of said elastic members.

Figure 3 is a schematic diagram illustrating yet another example of said elastic members.

Figure 4 is a diagram illustrating the configuration of the diaper in the present invention when being worn.

Figure 5 is a diagram illustrating an example of the configuration of the elastic members for the disposable diaper of the present invention.

Figure 6 is a diagram illustrating another example of the configuration of the disposable diaper of the present invention.

Figure 7 is a diagram illustrating another example of the configuration of the disposable diaper of the present invention.

Figure 8 is a diagram illustrating another example of the configuration of the disposable diaper of the present invention.

Figure 9 is a diagram illustrating an example of the configuration of the elastic members of the disposable diaper in the prior art.

Figure 10 is a cross-sectional view illustrating the groin portion of that shown in Figure 5.

Figure 11 is a diagram illustrating the configuration of the elastic members of the disposable diaper shown in Figure 6.

Figure 12 is a cross-sectional view illustrating the groin portion of that shown in Figure 11.

#### Explanation of symbols

- 1 Outer sheet
- 2 Two side edge portions
- 3 Waist opening portion's elastic gather
- 4 Thigh opening portion's elastic gather
- 5 Curved elastic member on waist portion

- 5-A Curved portion of curved elastic member (5)
- 5-B Linear portion of said elastic member
- 6 Interval between elastic members in the groin portion
- 7 Main body
- 8 Leak-proof sheet
- 9 Absorbing member
- 10 Outer surface member (center)
- 10' Outer surface member (side)
- 11 Thigh-portion elastic member
- 12 Two side edges

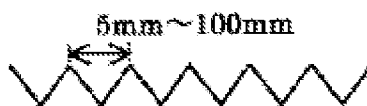


Figure 1

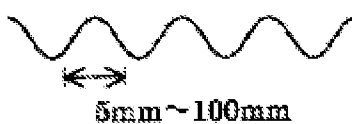


Figure 2

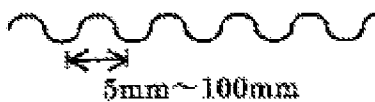


Figure 3

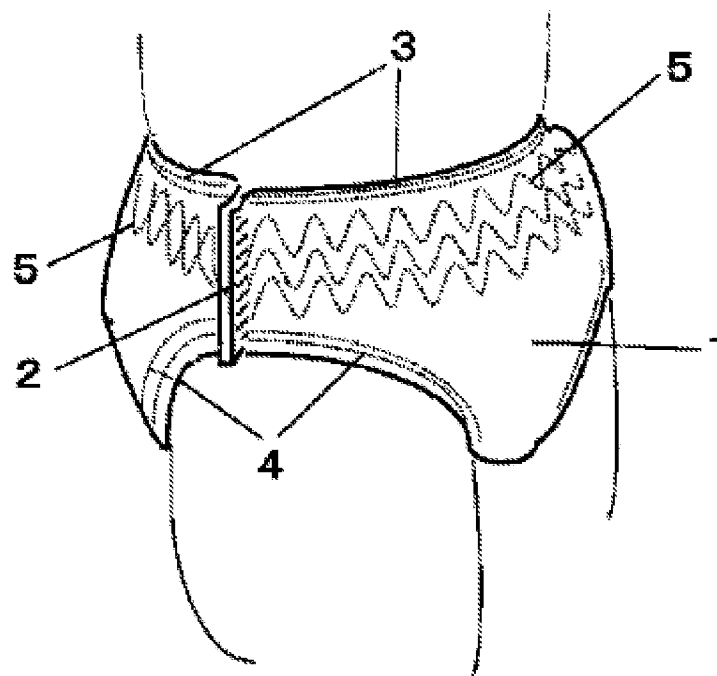


Figure 4

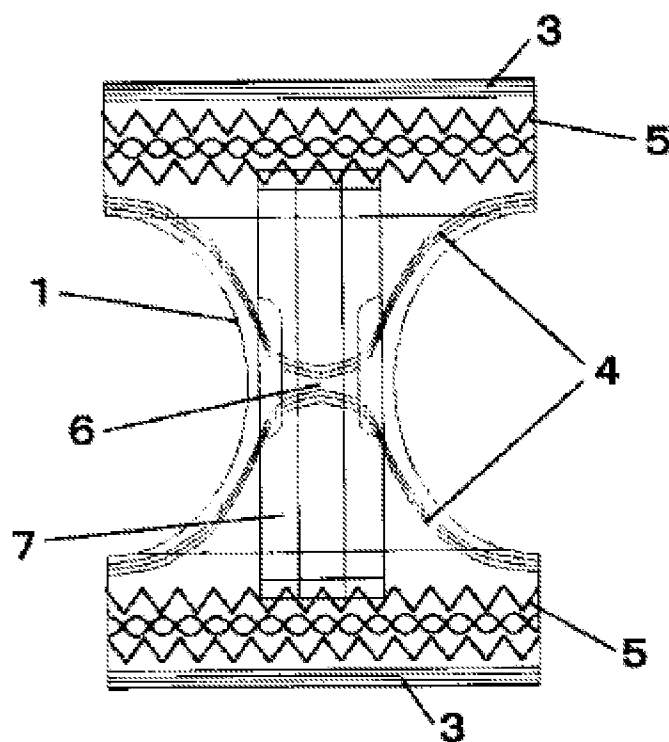


Figure 5

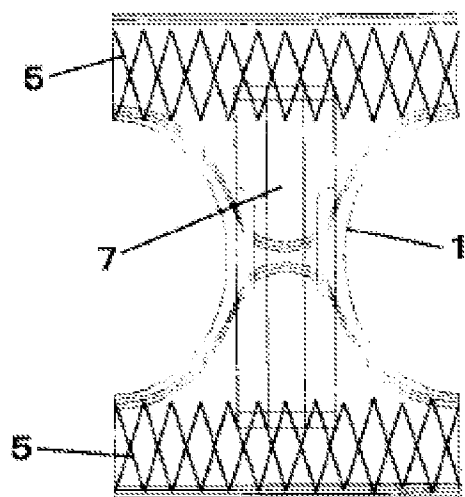


Figure 6

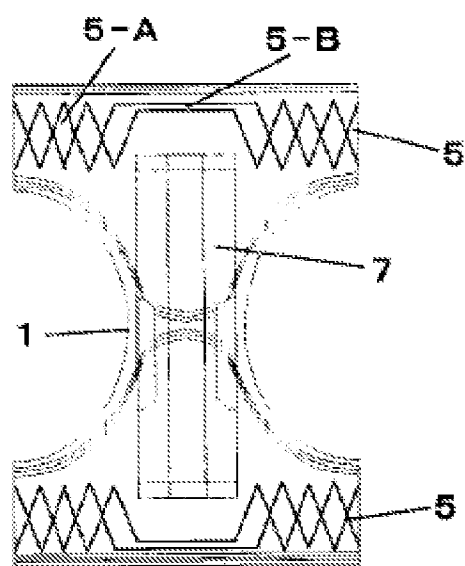


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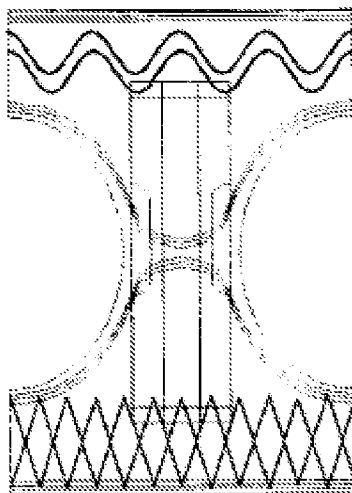


Figure 8

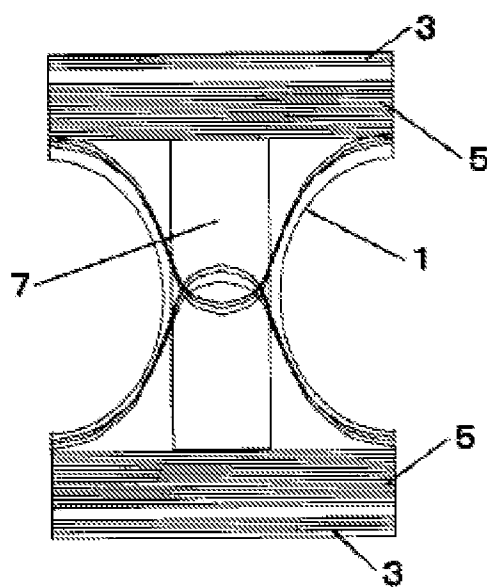


Figure 9

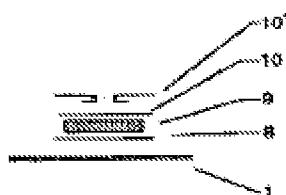


Figure 10

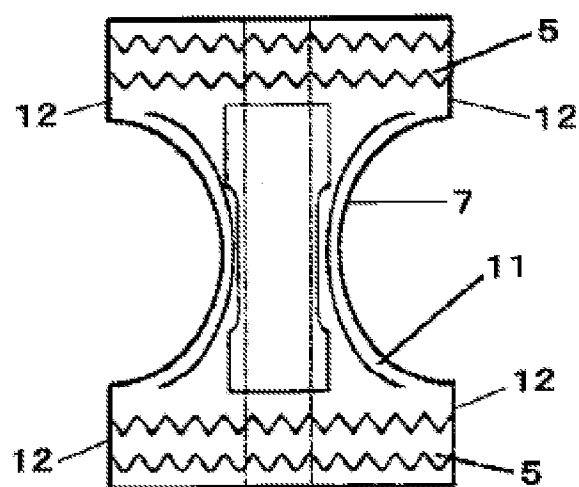


Figure 11

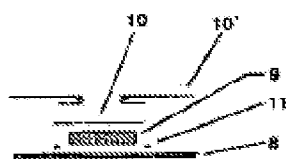


Figure 12